

Middle Fork Stanislaus River Bridge
(Dardanelle Bridge)
Spanning Middle Fork Stanislaus River
on California State Highway 108
Dardanelle vicinity
Tuolumne County
California

HAER No. CA-72

HAER
CAL,
55-DARD.V,
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Western Regional Office
National Park Service
U.S. Department of the Interior
San Francisco, California 94107

HISTORIC AMERICAN ENGINEERING RECORD

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Location: Spanning Middle Fork Stanislaus River on California State Highway 108
Dardanelle vicinity, Tuolumne County, California

UTM: 11-253040.4247190
Quad: Dardanelle, California 7.5'

Date of Construction: 1933

Engineer: F. Manhart
Bridge Department Staff
California Division of Highways

Present Owner: California Department of Transportation
District 10
1976 East Charter Way
Stockton, California 95206

Present Use: Highway bridge

Significance: The Middle Fork Stanislaus River Bridge, also known as the Dardanelle Bridge, represents the last known timber scissors truss--a bridge type well suited for quick erection in rugged locations without the use of falsework--in California. It was determined eligible for inclusion in the National Register of Historic Places at the State level under criterion C in 1987.

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PART. I. HISTORICAL INFORMATION

By the early 1930s, many of California's bridges, that were designed and erected in the late 19th and early 20th centuries, had reached obsolescence. Designs, which had been adequate for light, horse-drawn loads, were inadequate to meet the demands of increasing weights and volumes of motor vehicles. Thus, it was that in 1933 the State decided to replace an early bridge on the road leading from Sonora to the east side of the Sierra Nevada highway of Sonora Pass.

The State's first solution to the problem, a solution which must have appeared attractive in the growing fiscal calamity of the Great Depression, was to propose relocating a steel, pin-connected pony truss from Sullivan Creek, two miles east of Sonora, to this site nearly fifty miles further east. The rebuilt structure would have consisted of a 71-foot pony truss main span with a 27-foot steel stringer approach span. Founded on a concrete pier and concrete abutment, the bridge was to have a timber deck and a roadway width of twenty feet.

With the contract let to the firm of M. A. Jenkins and J. W. Hoopes of Sacramento, dismantling of the pony truss began on July 22, 1933. However, work stopped almost immediately when Tuolumne County officials protested, disputing ownership of the bridge. It seemed that the county had similar plans to reuse the bridge at a county road crossing of the South Fork of the Stanislaus River. On August 4, 1933, the State conceded ownership of the Sullivan Creek Bridge to Tuolumne County. A day earlier, State officials had signed an amended contract for the construction of the Middle Fork Stanislaus River Bridge.

Existing historical records do not indicate whether State bridge engineers had responded quickly to the State/County dispute in developing a design specifically tailored to this site, or whether they adapted a previously-used design. Given the extremely short time involved between the awarding of the original and amended contracts, and the fact that there were at one time other bridges of this type in California (though never in large numbers), the latter appears more likely.

The design, using a scissors truss main span with simple timber trestle approach spans, was ideally suited to this site where the Middle Fork Stanislaus River crashes through a deep, rocky gorge. The site precluded the use of elaborate falsework. Instead, the contractors threw logs over the channel, on which they erected sufficient falsework to erect the scissors truss main span. Since the scissors truss uses no lower chord, the contractors first erected the top chords, and then placed the battered end posts, fastening the whole with steel gusset plates bolted to the timbers. After positioning these assemblies, they poured the concrete footings for the end posts. Finally, they placed and adjusted the diagonal tension rods which run from gusset plates to the opposite end post footings.

The final construction report noted that great care had to be taken when excavating for foundations, since the granite was soft and seamy, leading to a danger of "overshooting" when blasting. Even with all precautions, the rock tended to break to adjacent faults or seams, a problem which would reassert itself in 1991.

The contractors built the bridge by hand labor, with only a pneumatic jackhammer used for drilling rock for blasting. Sand and gravel for concrete came from a bar in the river approximately three miles east of the bridge site; the builders screened aggregates by hand. The contractors used Calaveras brand Portland from a plant not far from Sonora, taking the required water directly from the river. Reinforcing and structural steel came from Palm Iron Works of Sacramento, trucked to the site by the contractors. All redwood timber came from the Union Lumber Company mill at Fort Bragg; Union Lumber delivered the materials to the site by truck.

The benefits of the elegant simplicity of the design, which allowed for easy erection, can be seen in the fact that on October 19, 1933, little more than two months after award of the amended contract, Jenkins and Hoopes completed construction. The State accepted the bridge from the contractors a week later, on October 26, 1933. Total cost of construction was just \$7,289.54, which included asphalt paving applied by State forces after the contractors finished construction.

Of the contractors, the State's final construction report stated that "Mr. Jenkins was inclined to quibble about details, but Mr. Hoopes [who acted as construction superintendent] was always agreeable and complied with instructions without question."

PART II. ARCHITECTURAL INFORMATION

The Middle Fork Stanislaus River Bridge (Bridge No. 32-13), also known as the Dardanelle Bridge, consists of a redwood timber scissors truss main span with redwood timber trestle approach spans. The approach spans are carried on four-column redwood timber bents with redwood bent caps. The abutments, bents, and truss endposts are all founded on Portland cement concrete pedestals resting directly on exposed granite bedrock. The bridge carries a laminated timber deck which was overlaid with concrete in 1946, this latter now itself overlaid with asphalt. Bridge railings are of timber construction. The bridge's five spans total 97 feet in length. The design was carried out by F. Manhart, an anonymous engineer of the Bridge Department of the California Division of Highways.

PART III. SOURCES OF INFORMATION

"Finding of Adverse Effect for a Proposed Bridge Replacement Project, Bridge 32-13, the 'Dardanelle Bridge,' on State Highway 108, Tuolumne County, California." Unpublished MS, California Department of Transportation, Sacramento, October 1988.

Gudde, Erwin G. California Place Names. Berkeley: University of California Press, 3rd edition, 1969.

Jelinek, James C. "Categorical Exemption/Exclusion Determination, 10-Tuo-108, 51.3/53.4, 10200 -214800. Public environmental document, California Department of Transportation, Stockton, December 13, 1988.

Jelinek, James C. Chief, Environmental Branch, District 10, to Kathryn Gualtieri, State Historic Preservation Officer, LS, June 6, 1990, regarding construction damage to historic Dardanelle Bridge.

Jelinek, James C. Chief, Environmental Branch, District 10, to Peter Vacura, Associate Bridge Engineer, LS, July 10, 1990, regarding appropriate falsework and repair procedures for historic Dardanelle Bridge.

Pierce, R. E., "Final Report for the Construction of a 95' Timber Bridge Across Middle Fork of Stanislaus River 52 Miles East of Sonora in the County of Tuolumne, Contract 411-KC-2, Amended, Road X-Tuo. 13-G," California Department of Transportation, Sacramento, November 13, 1933.

Snyder, John W. "Bridge No. 32-13, Middle Fork Stanislaus River." Unpublished MS, California Department of Transportation, Sacramento, September 8, 1978.

PART IV. PROJECT INFORMATION

In 1978, the California Department of Transportation proposed to replace the Middle Fork Stanislaus River Bridge. Following the bridge's evaluation as potentially eligible for inclusion in the National Register of Historic Places, the project was subsequently dropped until 1987, at which time a formal Determination of Eligibility was made.

The proposed project will replace the historic Dardanelle Bridge with a new bridge on new alignment, allowing preservation-in-place of the historic bridge. The project will result in minor realignment of State Highway 108 over a total project length of 1,950 feet.

Located within the Stanislaus National Forest, the project site is at an elevation of 6,000 feet in the Sierra Nevada, in an area dominated by heavy granite and basalt outcrops in a mixed conifer forest. The existing bridge is situated in an area which is highly regarded by the public and by the U.S. Forest Service for its visual beauty. A massive outcrop of granite commands the site, which is traversed by a deep, narrow gorge through which the Middle Fork Stanislaus River flows. The historic bridge is sandwiched between a granite outcrop on one side and a steep mountainous slope on the other, both of which constitute effective obstacles to consideration of alternative alignments further away from the existing bridge.

The new alignment and bridge will be constructed to current standards, with a 24-foot roadway and 6-foot shoulders. Right-of-way will not be established, as the project will be constructed under a U.S. Forest Service Use Permit.

The new bridge will be a 110-foot, single span, cast-in-place reinforced concrete box girder structure, constructed on new alignment approximately ten feet upstream of the existing bridge. The new bridge will have standard, 32-inch-high concrete safety railing, and will be at essentially the same elevation as

the existing bridge. Following completion of the new bridge, the historic bridge will be removed from vehicular service, and preserved in place for pedestrian/equestrian/bicycle use by the California Department of Transportation as a scenic overlook.

Following the 1987 Determination of Eligibility for the Dardanelle Bridge, a subsequent Finding of Effect in 1988 determined that the project would have an adverse effect upon the bridge, due to the proximity of the new bridge which will alter and diminish the bridge's integrity of setting, and which will constitute a visual element out of character with the relationship of the historic bridge and its setting. Based on this Finding of Effect, the California State Historic Preservation Officer, the U.S. Forest Service, the California Department of Transportation, and the Advisory Council on Historic Preservation was finalized in early 1989, specifying certain mitigation measures to be carried out. These include:

1. The historic bridge shall be blocked to vehicular access, and an interpretive display describing its historical significance shall be installed.
2. The bridge shall remain in the ownership of the California Department of Transportation (Caltran), which shall maintain it consistent with The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.
3. The bridge shall be documented to the standards of the Historic American Engineering Record (HAER), with copies made available to the State Historic Preservation Officer and appropriate local archives.

On Wednesday, May 30, 1990, the bridge sustained damage during construction of the new bridge. Contractor's forces engaged in blasting granite in preparation for placement of the west abutment of the new bridge overshoot--a problem noted in the 1933 construction of the historic bridge--and blew large granite fragments into the historic bridge, severely damaging the west approach spans. The damage to floor stringers, bents, deck, and railings caused closure of the eastbound lanes. The bridge sustained some further damage during the contractor's removal of the remaining granite outcrop by use of a backhoe-mounted hydraulic hammer, when large granite fragments rolled into the previously-damaged portion of the bridge. Fortunately, the trusses sustained no damage beyond a broken tension rod in the upstream truss.

On Monday, June 4, 1990, John Snyder, Caltran's Chief of Architectural and Historical Studies, in company with environmental personnel from Caltran's headquarters and District 10 (Stockton) office conducted a site inspection to determine the appropriate repairs to be carried out. Mr. Snyder determined that in-kind replacement of damaged members with full-dimension heart redwood would be consistent with appropriate preservation standards, and these repairs were subsequently carried out by the contractor.